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$\tan\theta=\dfrac{y}{x-c}$, $\cot\theta=\dfrac{v}{u-c}$, $\therefore\dfrac{y}{x-c}=\dfrac{u-c}{v}$. $\therefore yv=(x-c)(u-c)$..........(4.)

(2) and (3) in (1) and (4) gives, $2c(x-u)=a^2-b^2$, ...(5),

$(a^2-x^2)(b^2-u^2)=(x-c)^2(u-c)^2$........................(6). (5) in (6) gives

$\{4a^2c^2-(a^2-b^2)^2-4cu(a^2-b^2)-4c^2u^2\}\,(b^2-u^2)=(a^2-b^2+2uc-2c^2)\,(u-c)^2$.

$\therefore (74175-520u-16u^2)(3600-u^2)-(4u-95)^2(u-40)^2$.

$\therefore 32u^3-2840u^2+825u+3157375=0$. Let $u=z+\frac{355}{12}$.

$\therefore z^3-\frac{249575}{96}z+\frac{164676875}{3456}=0$.

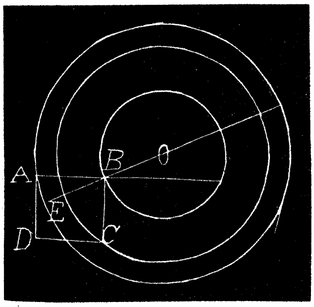
This equation has three roots.

$\therefore z_1=23.02208$, $z_2=36.23197$, $z_3=-58.43863$.

$\therefore u_1=52.60541$, $u_2=65.81530$, $u_3=-28.85530$.

$\therefore x_1=69.35541$, $x_2=82.56530$, $x_3=-12.10530$.

$\therefore y_1=9.47772$, $y_3=68.94535$.



The first values satisfy the problem in question; the second must be rejected as not admissible; while the third values satisfy the problem for the point within the field.

$\therefore$ area $ABCD=(x-c)^2+y^2=951.5672$ square chains$=95.15672$ acres.

When the point is within field, area$=(x-c)^2+y^2=7468.424$ square chains$=746.8424$ acres.

Also solved by *O. W. ANTHONY*.

34. **Proposed by THOS. U. TAYLOR, C. E., M. C., Department of Engineering, University of Texas, Austin, Texas.**

Given a variable parallelogrom $ABCP$, where P remains fixed. A moves on an irregular plane curve (closed) and C moves on another irregular plane curve (closed) whose plane is parallel to the plane of (A) curve. The generator PC moves completely around and returns to its initial position, AB always moving parallel to PC, and, of course, returns to its initial position. If distance between planes (A) and (C)$=h$, show by elementary mathematics and without using theorem of Koppe that volume of solid generated by variable parallelogram $ABCP=\frac{1}{2}h$ (area generated by AP+area generated by BC).

No solution of this problem has been received.

PROBLEMS.

38. **Proposed by F. M. PRIEST, Mona House, St. Louis, Missouri.**

Suppose two cylindrical iron shafts, each 6 inches in diameter and respectively, 20 and 40 feet in height, are both standing perpendicular at the sea level. They start to fall in still air, how long will it require each one to fall to a horizontal position ?

39. Proposed by **WILLIAM SYMMONDS, A. M.**, Professor of Mathematics and Astronomy, Pacific College, Santa Rosa, California.

A straight inflexible bar of uniform weight and thickness, length m is suspended at the two ends by a string without weight, length $l>m$ passing freely over a peg driven in a perpendicular wall. Describe and analyze the curve traced on the wall by the ends of the hanging bar.

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NOTE.—Problem No. 43, Calculus, should read as suggested by Dr. E. A. Bowser on page 60 of February number. Prof. Black had noted the correct form in his copy of Williamson, and so sent it to the MONTHLY, but an error was made in printing the expression. A letter from Dr. Williamson, Trinity College, Dublin, Ireland, acknowledges the error in his work, and says it will be corrected in the forthcoming new edition of his book.

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WANTED.—Some one to give a list, partial or complete, of the curves of the fourth degree that have received particular names, such as the "Lemniscate," "Cocked Hat," "Devil's Walking Stick," "Conchoid," etc.

COOPER D. SCHMITT.

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BOOKS.

Warren Colburn's First Lessons : Intellectual Arithmetic upon the Inductive Method of Instruction (1891).

H. N. Wheeler's Second Lessons (1893). Boston, New York, and Chicago: Houghton, Mifflin and Company.

First Lessons, which has been famous for three-fourths of a century, contains, besides the four fundamental operations, little but fractions and denominate numbers. It has no rules and but little written work. It follows the inductive method—the method of "Practice before Theory"—which is based on the soundest psychological principles. This book should be in the hands of every teacher, whether used as a class book or not.

Wheeler's Second Lessons is intended as a continuation of Colburn's First Lessons, and is well adapted for that purpose.

J. M. C.

Logarithmic Tables. By Professor George William Jones, of Cornell University. Sixth Edition. Royal 8vo. Cloth. 160 pages. Price, $1.00. Published by the author.

These are the best tables that we have yet seen. Eighteen tables (four-place, six-place, ten-place) with full explanation for their use, for use in the class-room, laboratory, and the office. The tables of Mathematical Constants, Chemistry, Engineering, and Physics deserve special mention. Also Table IX which gives the prime factors of composite numbers less than 20000, and Tables X and XI which give the squares and cubes of all